

Market and price formation

Commentary for teachers

1 Overview

1.1 Topic and contents

The topic of this teaching unit is the formation of prices, on markets in general and on well-organised and transparent markets (e.g. a commodities exchange) in particular. With the aid of a group game, students experience first hand how markets function. The teaching unit is a good introductory tool, explaining basic concepts such as price formation on markets, equilibrium, supply and demand, trading profit and market efficiency; it also offers some deeper insights into selected points.

1.2 Didactic format

Group game: The main element of this teaching unit is a game played in class. The game is supplemented by an interactive presentation, **Pitgame**. A computer with internet access and a projector are all that is needed. Pitgame can be launched via www.iconomix.ch/en/market. Technical requirements are an internet connection and an up-to-date browser (Internet Explorer, Safari, Firefox, Chrome).

1.3 Time required

Two to four lessons, depending on the degree of detail with which the topic is addressed.

1.4 Suitable subjects








Economics and humanities.

1.5 Level

Intermediate. The game itself can be used in a wide range of contexts, however the follow-on tasks (worksheets) can be configured as appropriate, depending on how advanced the students are. Worksheets 2 and 3B are suitable for secondary school students (GYM and BM), while worksheet 3A is pitched more at students undergoing vocational training (DH and KV).

1.6 Documentation

The teaching unit consists of this commentary for teachers, the Pitgame interactive presentation and the following teaching material:

-  'Introduction to Pitgame' slides
-  Knowledge sheet
-  Worksheet 1
(simple, based closely on game, game evaluation for all types of school)
-  Worksheet 2
(difficult, based closely on game, GYM/BM)
-  Worksheet 3A
(simple, based on topic, transfer questions DH/KV)
-  Worksheet 3B
(difficult, based on topic, transfer questions GYM/BM)
-  Sample answers

	Attitude	Knowledge	Ability
Personal skills	Able to assume the role of a trader in a well-organised market.		Able to identify and critically examine the trade-offs between economically efficient ideas and socially desirable (or demanded) decisions.
Social skills	Willing to carry out simple price negotiations.	Able to present and defend arguments and analytical results (of transfer tasks) in class.	Able to discuss the functioning of markets with each other at a level of detail commensurate with their abilities.
Professional skills	Willing to familiarise oneself with the functioning, strengths and specificities of the market as a distribution mechanism.	Able to explain how a market price is formed in a well-organised market and what an equilibrium price is. Able to explain what is meant by trading profit and market efficiency.	Able to compare findings from the evaluation of the game with economic theory and observations from everyday life.

2 Notes for this teaching unit

2.1 Pitgame

In Pitgame, students take on the role of traders on a commodities exchange. Their goal is to purchase the commodity at the lowest possible price or sell it at the highest possible price. The maximum purchase price or minimum sale price is specified on each student's playing card.

A minimum of 12 players is required for the game. Game preparation, as well as playing the game and evaluating it in class, are supported by the interactive, browser-based iconomix presentation of the same name.

2.2 Economic background

In 1948, Edward Hastings Chamberlin (1899–1967), an American economist, published a paper in which he developed the Pitgame market experiment. His goal was to demonstrate systematic divergences from the accepted theory of perfect (or perfectly competitive) markets. Paradoxically, today his experiment is very well suited to teaching students (and not just those studying economics) about basic concepts such as price formation on markets, equilibrium, supply and demand, trading profits, and market efficiency.¹

3 Possible lesson plan

The teaching material is designed with a pro-active and problem-solving approach in mind.

The targeted skills can be developed in three phases, as follows:

Phase 1: Engage with the material

In the first phase, the students play Pitgame. The teacher oversees the game and registers the completed trades (or delegates this task).

1. The teacher sets up a new game (determines the number of players, selects the product) and prints out the playing cards (either immediately before the game or in advance).
2. The teacher explains the game and the rules using the 'Introduction to Pitgame' presentation.
3. The teacher distributes the cards with the buyer/seller roles and the purchase/sale orders.
4. When the game starts, the students try to complete a trade in the designated trading area, based on the details on their cards.
5. As soon as two people agree a trade, they go to the teacher (or trade registration area) and hand over their cards. The teacher (or person in charge of the trade registration area) enters their names and the trade price into the computer. The agreed trade prices are immediately beamed onto the projector screen.
6. Once no more trades are being agreed, the teacher announces the end of the round, redistributes the cards and starts a new round.

¹ Source: Charles A. Holt (2007), Markets, Games & Strategic Behavior, Addison Wesley (Boston, US)

Notes on game preparation

- A printer will be required if the teacher wishes to print out the playing cards in class.
- Nonetheless, it's a good idea to print the cards in advance and bring them to class. Then, during the lesson, you simply have to re-enter the same number of players and the same product as before in the computer, so that you can use the cards you prepared. (If the parameters differ, the names and prices on the playing cards will not match those in the system).
- If there are fewer students than pre-printed cards, you have the following options:
 - a. Remove the card with the lowest maximum purchase price. If necessary, you can also remove the card with the highest minimum sale price. And so on.
 - b. The teacher prints out a second set of playing cards and decides in class which game to run (e.g. for a class of 20 students, he/she prints out a set of cards for 20 players and a set for 18 players).

Notes on playing the game

- Plan in advance how the classroom should be arranged. Trading should be restricted to one area of the room (the trading area). The trade registration area, meanwhile, should be set up in such a way that the players queuing to have their trades registered do not get in the way of the projector or the other players.
- The teacher may find it more efficient to have a (nimble-fingered) student record the trades.
- To make it easier to identify the buyers and sellers, the two groups could stand on opposite sides of the trading area at the beginning of each round.
- A minimum of three rounds should be played. A relatively stable price usually comes about quite quickly, at which stage the game can be concluded.
- To allow the equilibrium price to establish itself more quickly, the students should refrain from forming groups (or sub-markets). They should also keep an eye on the prices on the screen and try to negotiate the best possible price, rather than accepting the first offer they get. If necessary, the teacher should remind them of these points from the second round onwards.

Phase 2: Discuss and reflect

The second phase involves an evaluation and a session in which the students reflect, either individually or in groups, on the way the Pitgame simulation went.

Afterwards, the students work through the **knowledge sheet**.

Reflecting on how the game went, individually or in the group

Once Pitgame is over, the participants think about how they played the game. A set of written questions guides this process (Worksheet 1). The idea here is that students explore why they made certain decisions at certain times and thereby gain an understanding (still partly intuitive at this stage) of the price mechanism.

Evaluation using interactive presentation

The students examine the evaluation charts and the table in the interactive presentation (can be printed out via the print function in the browser). With the help of written questions (Worksheet 1), they interpret their observations and see how they tie in with the concepts of equilibrium, supply and demand. The teacher oversees the discussion and provides additional information where required. In order to get the students to participate actively in the discussion, and so that they do not underestimate the importance of the evaluation, present only the chart with the trade curve first. Introduce the chart with the supply and demand curve once the discussion is underway.

Knowledge sheet

Working through the knowledge sheet (in class or at home) helps students understand the economic principle governing market and price formation. It also explains once again the technical terms used in the teaching unit. The knowledge sheet prepares the students for phase 3 of the teaching unit.

Phase 3: Practise and apply

This phase is all about consolidation and transfer – the students can reinforce the skills they have acquired through practice and expand their skills by tackling more challenging tasks.

Three documents are available for this phase:

- **Worksheet 2**

(difficult, based closely on game, GYM/BM)

While the advanced questions include more cognitively demanding tasks, they are once again directly related to Pitgame. The tasks are not linked, so the teacher can configure them however he or she sees fit.

- **Worksheet 3A**

(simple, based on topic, transfer questions DH/ KV)

The transfer questions in Worksheet 3A – featuring examples from everyday life which the students can easily identify with – are intended to reinforce the concepts behind Pitgame.

- **Worksheet 3B**

(difficult, based on topic, transfer questions GYM/BM)

The transfer tasks help the students to practise and internalise the concepts in unfamiliar contexts. The hands-on nature of the cases selected facilitates the transfer from Pitgame to the multifarious world of real-life markets. The tasks focus on market imbalances, the effects of market changes, government interventions, and the special characteristics of markets like the housing market. Furthermore, one task elaborates on the subject of price elasticities. The students come to understand the relevance of the concepts they have been exploring for their own lives. The teacher can pick the tasks that best match the needs and interests of the class.

Appendix: Summary of 2017 revision

Commentary for teachers

- Now contains references to new worksheets 1–3B and their application
- ‘Useful questions and answers for Pitgame’ section has been shortened as key questions are now included in Worksheet 1
- Skills matrix has been reworked
- References to other teaching material have been updated

Worksheet 1

(simple, based closely on game, game evaluation)

- New worksheet containing questions about the game that students can reflect on individually and discuss in class
- Some tasks taken over from previous worksheet
- Tasks from previous knowledge test designed to check students’ retention taken over

Worksheet 2

(difficult, based closely on game, GYM/BM)

- New worksheet containing more challenging tasks relating to Pitgame

Worksheet 3A

(simple, based on topic, transfer questions DH/KV)

- New worksheet with simpler transfer questions

Worksheet 3B

(difficult, based on topic, transfer questions GYM/BM)

- New worksheet with very demanding tasks

The four new worksheets replace the old worksheet, the knowledge test and the advanced question.

Useful questions and answers for Pitgame

1. Isn't the result (equilibrium price) a foregone conclusion, if the reservation prices are predetermined?

The reservation prices merely provide a fairly wide price range; even within this range, it is possible for prices to diverge widely from the equilibrium price. For example, a buyer and a seller who each have an extremely low reservation price could agree to trade at a price well below the equilibrium.

2. Why are the cards redistributed at the end of each round?

Simply to ensure that it's not always the same players who find themselves with little or no chance of making a trade.

3. Why can't the students set up the orders (reservation prices) themselves? They have no power to decide anything!

This was done for practical reasons. It makes it possible to prepare the game in advance (and no time is wasted in class). Anyway, the game would not be very different if the players set the reservation prices themselves. The important point is that the players have to decide how much to concede during trading.

4. Isn't it very unnatural to have predetermined reservation prices? What are they supposed to represent?

At some point, every buyer reaches an upper price threshold above which they would stop buying a product. The only unnatural thing is that in the game this threshold is written down, rather than being a subconscious concept, as is often the case in real life. Likewise, every seller also has a lower price threshold. We could also postulate that the players are traders who receive orders in which their customers set binding limits.